REMARKS

This Amendment is in response to the Office Action mailed on December 10, 2002. Claims 1, 3, 7-9, 11-12, 14, 16-18, 20-21 and 34-38 are pending in the application and have been rejected. Applicants respond to the rejection of 1, 3, 7-9, 11-12, 14, 16-18, 20-21 and 34-38 and the issues raised in the Office Action as follows.

Response to objection to specification

The specification was objected to as failing to provide proper antecedent basis for the claimed subject matter. In particular, claims 1 and 3 recite a means for controlling roll attitude and claim 34 recites a means for controlling roll parameters. Claim 34 has been amended to recite a means for controlling roll attitude which is properly supported by Applicants' specification.

FIGS. 17-18 and 23 illustrate embodiments of bending assemblies including bending elements energizable to provide a means for controlling the roll attitude of a head assembly. In particular, FIGS. 17-18 illustrated an embodiment of a gimbal spring including opposed bending elements 242 which are energizable to adjust a roll attitude of the head assembly. (Applicants' specification, page 18, lines 9-15). In one embodiment the bending elements 242 are energized to bend one gimbal beam upwards and another gimbal beam downwards to adjust the roll attitude of the head assembly. (Applicants' specification, page 18, lines 9-15). In another embodiment illustrated in FIG. 23, opposed bending elements 268, 274 are energized to adjust the roll attitude as illustrated by arrow 278. (Applicants' specification, page 23, lines 22-31).

FIG. 19 illustrates an embodiment for energizing bending assemblies as illustrated by the solid and combination solid/dotted lines to adjust the roll attitude of a head assembly. (Applicants' specification, page 19 line 25-page 20, line 30).

As described in Applicants' specification, roll attitude can be adjusted by energizing a single bending element or energizing a plurality of bending elements for example, by applying currents of varied amplitudes or polarities (see FIG. 19, for example). (Applicants' specification, page 24, lines 19-24). Based upon the foregoing the recited means for controlling roll attitude is fully supported by Applicants' specification and withdrawal of the objection to the specification is respectfully requested.

Response to claim rejections - 35 U.S.C. § 112

Claims 34-36 were rejected under 35 U.S.C. § 112, Second Paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants have amended claim 34 to recite means for controlling roll attitude to provide consistent antecedent basis with respect to independent claim 1 from which claim 34 depends.

Response to claim rejections - 35 U.S.C. § 103

Claims 1, 3, 7-9, 11-12, 14, 16-18, 20-21 and 34-38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art (AAPA), FIGS. 1-16, in view of Suzuki, JP 10-069747. Claims 1, 3, 7 and 16 are independent. Claims 34-36 are dependent upon claim 1. Claims 8-9, 11-12, 14 and 37-38 are dependent upon claim 7 and claims 17-18 and 20-21 are dependent upon claim 16.

Claims 1, 3 and 34-36 are means-plus-function claims which are interpreted to include the corresponding structure disclosed in the specification and equivalents. Claim 1 and dependent claims 34-36 recites a means for controlling roll attitude of a head assembly and claim 3 recite a means for dynamically controlling roll attitude of a head assembly. As described in Applicants' specification, the recited means provides a dynamic system for adjusting roll attitude of a head assembly to compensate for variations in the fly height between inner and

outer sides of the head assembly which provides advantages over prior static control assemblies. In particular as described, it is common practice in the industry to fabricate the head suspension to apply a load force spaced from the longitudinal centerline of the head assembly to compensate for differing forces exerted on inner and outer sides of the head assembly. (Applicants' specification, page 10, lines 19-27). However, as described, such static compensation techniques do not account for differing forces exerted on inner and outer sides of the head assembly as it is moved between the inner and outer diameters of the disc. As illustrated in the one embodiment of FIG. 19, the recited means provides for dynamic control of the roll attitude of the head assembly based upon the radial position of the head assembly over the disc to compensate for differing forces exerted on inner and outer sides of the head assembly.

Claims 1, 3 and 34-36 have been rejected on the basis that Suzuki at least teaches a piezo-electric device on gimbals 5, 6 to dynamically control/adjust (with controller 11) at least the flying height of the slider. Thus, the Office Action fails to establish a *prima facie* basis to reject claims 1, 3 and 34-36 based upon the combination of AAPA and Suzuki, since the combination of references fails to teach or suggest the subject matter claimed, namely means for controlling roll attitude of a head assembly as discussed above.

Claim 7 and dependent claims 8-9, 11-12, 14 and 37-38 recite *inter alia* a plurality of bending assemblies energizable to adjust pitch and roll attitudes of the head assembly which is not taught nor suggested by the combination of AAPA and Suzuki. As discussed, the first and second bending assemblies can be energized *inter alia* by supplying current of different polarity, different amplitude or applying current to or energizing a single bending assembly to adjust the roll attitude of the head assembly. Rejection of claim 7 and dependent claims 8-9, 11-12, 14 and 37-38

on the basis that Suzuki teaches a piezo-electric device to dynamically control/adjust at least the fly height of the slider fails to consider each of the recited claim elements and does not establish a *prima facie* basis to reject the claims. Claim 8 is further distinguishable over AAPA and Suzuki.

Claim 16 and dependent claims 17-18 and 20-21 recite *inter alia* a gimbal portion having a plurality of bending elements including at least one bending element on a first side of a roll axis and at least one bending element on a second opposed side of the roll axis actuatable to adjust a roll attitude of the head assembly. As previously discussed the combination of AAPA and Suzuki does not teach nor suggest the subject matter claimed. Claim 21 is further distinguishable over AAPA and Suzuki.

Based upon the foregoing, reconsideration and allowance of pending claims 1, 3, 7-9,. 11, 12, 14, 16-18, 20, 21 and 34-38 are respectfully requested. New claims 39-~~45~~ 40 are added and favorable consideration thereof is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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MARKED-UP VERSION OF REPLACEMENT CLAIMS

7.(Twice Amended) A head suspension for mounting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly radially over a surface of the disc, the head suspension comprising:

a load beam portion for exerting a load force on the head assembly relative to a load point;

a gimbal portion having the head assembly coupled thereto to allow the head assembly to pitch and roll relative to the load point and the gimbal portion including opposed spaced gimbal beams on opposed sides of the load point; ~~,~~and

a plurality of bending ~~elements~~assemblies including ~~at least one~~a first bending ~~element~~assembly ~~on~~ coupled to one of said gimbal beams and ~~at least one~~a second bending ~~element~~assembly ~~on~~coupled to another of said gimbal beams and the first and second bending assemblies being energizable to adjust pitch and roll attitudes of the head assembly.

8.(Amended) A head suspension as claimed in claim 7, wherein~~:~~ ~~the plurality of bending elements each includes opposed leads coupled thereto to selectively energize the plurality of bending elements~~the first bending assembly includes a first bending element energizable via a first electrical interface coupled to the first bending element and the second bending assembly includes a second bending element energizable via a second electrical interface coupled to the second bending element

to independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

9. (Amended) A head suspension as claimed in claim 7, wherein: the first bending assembly includes ~~at least one~~a first bending element on the one of said gimbal beams and the second bending assembly includes a ~~at least one~~ second bending element on the other of said gimbal beams and the first and second bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion.

11. (Amended) A head assembly as claimed in claim 7 wherein: the plurality of bending assemblies include a bending element ~~are~~ formed of a piezoelectric material.

12. (Amended) A head suspension as claimed in claim 7, wherein: the first bending assembly includes ~~at least one~~a first bending element on the one of said gimbal beams and the second bending assembly includes ~~at least one~~a second bending element on the other of said gimbal beams and the first and second bending elements have an elongated length extending along an elongated length portion of the gimbal beams.

14. (Amended) A head suspension as claimed in claim 8, wherein the ~~plurality of~~first and second bending elements include opposed leading and trailing ends and the first and second electrical interfaces include opposed leads ~~are~~ coupled proximate to the opposed leading and trailing ends of the ~~plurality of~~first and second bending elements.

21. (Amended) A head suspension as claimed in claim 16, wherein: ~~the plurality of bending elements each include opposed leads coupled thereto to selectively energize the plurality of bending elements~~ a first electrical interface is coupled to the at least one bending element on the first side of the roll axis and a second electrical interface is coupled to the at least one bending element on the second opposed side of the roll axis to independently energize the first and second bending elements to adjust the roll attitude of the head.

34. (Amended) The head suspension assembly of claim 1 wherein the means for controlling roll ~~parameters~~attitude includes a plurality of bending elements on opposed sides of the roll axis.

37. (Amended) The head assembly of claim 9 wherein the opposed spaced gimbal beams have a different coefficient of thermal expansion than the ~~plurality of~~first and second bending elements to form the bi-metal structure having the different coefficients of thermal expansion.

38. (Amended) The head assembly of claim 7 wherein the ~~at least one bending element on the one of said gimbal beams and the at least one bending element on the other of said gimbal beams~~ first and second bending assemblies are energized based upon a radial position of the head assembly relative to the disc.